

Mineral Industry Surveys

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PRECIOUS METALS IN MARCH 2000

U.S. mines produced 27,600 kilograms (kg) of gold and 172,000 kg of silver in March 2000. Compared with February, production of silver was up 12% in Nevada.

Gold

Domestic.—Western Australia-based Golden Refining Corp. reported that its U.S. precious metals refining subsidiary Handy & Harman Refining Group (HHRG) applied for Chapter 11 protection. The bankruptcy filing followed the disappearance of \$12.5 million of gold from a vault in Peru. HHRG's banking facilities have been frozen and its refining plants are operating on a restricted basis (Platt's Metals Week, 2000d).

International.—Gold transactions on the London bullion market declined during March. The average daily turnover was 0.73 million kg of gold, down 19% from February, and was the second-lowest level on record. Turnover was about 15% lower than March of 1999 (American Metal Market, 2000b).

Researchers at Australia's Monash University may have discovered a way to use chloride to extract gold from ore. A type of activated carbon has been identified that keeps the gold chloride ion intact rather than separating on contact with carbon, as is normally the case with cyanide extraction of gold (Mining Journal, 2000a).

Australia's Dome Resources Inc. is finishing the clean-up of potassium cyanide pellets that covered a 2,500-square-meter area, 15 kilometers from its Tolukuma gold mine in Papua New Guinea. A cyanide spill occurred on March 22, when a 1,000-kg crate of potassium cyanide pellets fell from a helicopter flying to the mine. All visible pellets have been collected into sealed containers and the area has been sprayed with neutralizing chemicals in an attempt to prevent the cyanide from reaching the river (Metal Bulletin, 2000).

The Hungarian government has filed a lawsuit against

Romanian parties involved in the accidental dumping of more than 20 million kg of cyanide, lead, and zinc that poisoned central Europe's river system in February and March. Hungary was also seeking compensation from Esmeralda Exploration Ltd., the Australian company in partnership with the government of Romania in a gold mine in the Baia Mare region where the Tiza and Danube rivers were contaminated (American Metal Market, 2000c).

The Bank of England auctioned 25,000 kg of gold on March 21. The auction realized an average price of \$285.25 per troy ounce of gold and was three times oversubscribed. After the auction, the price of gold dropped to just above \$283 per troy ounce of gold. The United Kingdom Treasury announced when it unveiled its auction plans in May 1999, that 40% of the proceeds would be invested in U. S. dollars, 40% in euros, and 20% in Japanese yen (Platt's Metals Week, 2000c).

The chairman of France's parliamentary finance committee suggested that some of the central bank's gold reserves could be sold to finance the state pension system. The Bank of France could sell the equivalent of 150 billion francs of gold, which at current prices represents about 2.4 million kg of gold. France holds a total of 3.2 million kg of gold, placing it third in gold holdings after the United States and Germany. Because the Banque de France is part of the European Central Bank (ECB), gold sales need to be conducted through the ECB (Platt's Metals Week, 2000b).

The Australian Central Bank has sold 30,000 kg of gold and it is planning a sale of another 60,000 kg of gold. The disposal of gold, which was in accordance with the agreement signed by 15 central banks on September 26, 1999, will reduce Australian gold holdings to about 320,000 kg of gold (Platt's Metals Week, 2000a).

Update.—AngloGold Ltd., the world's largest gold producer, is spending \$467 million to expand its operations outside South

Africa. AngloGold has signed an agreement to acquire 50% of the Geita gold mine in Tanzania from Ghana's Ashanti Goldfields Co. and a 50% share of the Morila gold project in Mali from Randgold Co. Geita is scheduled to begin gold production in the third quarter, producing about 4,700 kg of gold in 2000 and about 15,000 kg of gold per year subsequently at an operating cost of \$170 per troy ounce of gold (American Metal Market, 2000a).

Silver

Scientists in Sweden have isolated bacteria that grow silver crystals and store them on the edges of their cell walls. The bacteria, Pseudomonas stutzeri, were originally found growing naturally on rocks in silver mines. The researchers were able to grow the bacteria in the laboratory and manipulate the shape in which they formed silver crystals. Most of the crystals were composed of pure silver, but some were silver sulfide. The scientists also discovered that the bacteria could produce and store as much as 25% of the cell's weight in silver. This discovery could lead to new techniques for the recovery of silver from ores as well as growing super-thin, and elastic-like silver crystals to specific shapes and sizes for use in electronics and optical applications (Silver News, 2000).

Minefinders Corp. Ltd. is in the process of conducting an infill and exploration drilling program at its Dolores gold-silver property in Chihuahua State, Mexico. The company received assay results from the first four holes completed with silver values ranging up to 512 grams per ton and gold values up to 31 grams per ton. Minefinders' geologists reportedly have identified a large domal intrusion, as well as four smaller domes in a structural zone. The main mineralization zone is hosted by andesitic lava flows, latite pyroclastics, and dykes. The company regards the main zone as being part of a much larger epithermal gold-silver system (Mining Journal, 2000b).

Platinum-Group Metals

While PGM prices have fallen from February highs, prices in

2000 have remained considerably higher than in 1999. On March 29, 2000, the Engelhard unfabricated price of palladium was \$635.00 per troy ounce (ounce), \$271.78 above its 1999 average price. On the same date, platinum was \$485.00 per ounce, \$106.06 above its 1999 average. After reaching highs of more than \$800 per ounce in February, the rise of palladium prices was effectively halted after the Tokyo Commodity Exchange (TOCOM) took steps to limit trading activity. As TOCOM is the most important palladium exchange in the world, the move triggered a major retreat in the price of palladium and it fell below \$700 per ounce. On March 29, palladium fixed at \$573.00 per ounce in London, its lowest since February 10, 2000 (Platt's Metals Week, 2000e).

References Cited

- American Metal Market, 2000a, AngloGold pegs \$467 for African stakes: American Metal Market, v. 108, no. 66, April 6, p. 6.
- ——2000b, Gold, silver trading declines: American Metal Market, v. 108, no. 72, April 14, p. 6.
- ——2000c, Hungary aims pollution suit at Romania: American Metal Market, v. 108, no. 55, March 22, p. 7.
- Metal Bulletin, 2000, Dome resources cleans up PNG cyanide spill: Metal Bulletin, no. 8462, March 27, p. 9.
- Mining Journal, 2000a, Chloride option for gold recovery: Mining Journal, v. 334, no. 8578, April 14, p. 288.
- ——2000b, Dolores drilling: Mining Journal, v. 334, no. 8572, March 3, p. 175. Platt's Metals Week, 2000a, Australian bank to sell 90 mt of gold: Platt's Metals Week, v. 71, no. 15, April 10, p. 4.
- ——2000b, French bank plans no gold sales of yet: Platt's Metals Week, v. 71, no. 14, April 3, p. 15.
- ——2000c, Gold yo-yos after fifth bank of England sale: Platt's Metals Week, v. 71, no. 13, March 27, p. 2.
- ——2000d, Refiner Handy & Harman files for Chapter 11: Platt's Metals Week, v. 71, no. 14, April 3, p. 1.
- ——2000e, U.S. PGM traders angry at TOCOM trading freeze: Platt's Metals Week, v. 71, no. 12, March 20, p. 6.
- Silver News, 2000, Bacteria resistant to silver may have industrial applications: Silver Institute, Silver News, April/May, p. 4.

TABLE 1 MINE PRODUCTION OF RECOVERABLE GOLD AND SILVER IN THE UNITED STATES, BY STATE 1/

(Kilograms)

				Other	
Gold	Alaska	California	Nevada	States 2/	Total
1999: p/					
March	1,310	1,440	20,900	4,270	27,900
April	1,380	1,440	21,400	4,350	28,600
May	1,340	1,460	21,700	4,180	28,600
June	1,310	1,520	22,600	4,270	29,700
July	1,390	1,420	20,200	4,400	27,400
August	1,390	1,350	21,100	4,350	28,200
September	1,360	1,370	21,300	4,300	28,300
October	1,260	1,540	21,400	4,390	28,600
November	1,180	1,640	21,800	4,410	29,100
December	1,260	1,810	21,400	4,580	29,100
January-December	13,200	15,000	214,000	43,500	285,000
2000:					
January	1,180 r/	1,530 r/	21,600 r/	4,300	28,600 r/
February	1,130 r/	1,440 r/	19,600 r/	4,150	26,300 r/
March	1,180	1,470	20,500	4,450	27,600
January-March	3,480	4,440	61,700	12,900	82,500
				Other	
Silver	Arizona	Idaho	Nevada	States 3/	Total
1999: p/					
March	17,600	34,600	67,100	60,800	180,000
April	16,500	34,500	46,000	71,000	168,000
May	17,200	35,700	42,400	67,200	162,000
June	16,200	34,500	48,100	69,000	168,000
July	16,600	35,700	36,900	67,800	157,000
August	14,600	35,700	37,100	63,900	151,000
September	13,900	34,900	45,100	62,500	156,000
October	13,500	35,700	46,100	63,000	158,000
November	12,100	34,900	39,000	61,000	147,000
December	14,700	34,900	72,400	61,900	184,000
January-December	153,000	351,000	480,000	648,000	1,630,000
2000:					
January	W	34,400 r/	58,900 r/	63,100 r/	156,000
February	W	34,300 r/	64,000	60,800	159,000
March	W	34,300	71,400	65,900	172,000
January-March	W	103,000	194,000	190,000	487,000

p/ Preliminary. r/ Revised. W Withheld to avoid disclosing company proprietary data.

 $^{1/\,\}text{Data}$ are rounded to no more than three significant digits; may not add to totals shown.

^{2/} Includes Arizona, Colorado, Idaho, Montana, New Mexico, South Carolina, South Dakota, Utah, and Washington.

^{3/}Includes Alaska, California, Colorado, Missouri, Montana, New Mexico, New York, South Carolina, South Dakota, Tennessee, Utah, Washington, and States indicated by symbol W.

TABLE 2 SELECTED PRECIOUS METAL PRICES

(Dollars per troy ounce)

	Gold	Silver	Platinum	Palladium
Engelhard Industries:				
1999:				
Low/date	253.88 (July 20)	4.91 (January 4, April 14,		
		May 28, and June 4)	344.00 (January 28)	293.00 (May 4)
High/date	326.70 (October 5)	5.75 (September 28)	457.00 (November 16)	456.00 (December 29)
Average	279.91	5.25	378.94	363.20
2000:				
February:				
Low/date	284.13/1	5.09/28	475.00/25	491.00/1
High/date	313.88/7	5.53/7	573.00/17	815.00/22
Average	300.75	5.29	519.95	637.40
March:				
Low/date	276.87/30	4.95/30	470.00/2 and 3	605.00/31
High/date	294.05/1	5.18/21	504.00/22	725.00/15
Average	287.53	5.10	483.74	679.39
April:				
Low/date	276.17/28	4.96/26 and 27	473.00/26	570.00/10, 11 and 13
High/date	283.63/11	5.18/13 and 18	527.00/5	610.00/5 and 28
Average	280.88	5.10	499.79	587.05
Year to date				
Low/date	276.17 (April 28)	4.95 (March 30)	416.00 (January 6)	437.00 (January 6)
High/date	313.88 (February 7)	5.53 (February7)	573.00 (February 17)	815.00 (February 22)
Average	288.65	5.18	486.70	590.37
Handy and Harman:				
1999: Average	278.81	5.25	XX	XX
2000:				
February	299.60	5.30	XX	XX
March	286.39	5.10	XX	XX
April	279.75	5.10	XX	XX
Average year to date	287.50	5.18	XX	XX
London Final: 1/				
1999: Average	278.77	5.22	XX	XX
2000:				
February	299.86	5.25	XX	XX
March	286.39	5.06	XX	XX
April	279.69	5.06	XX	XX
Average year to date	287.57	5.14	XX	XX
XX Not applicable				

XX Not applicable.

1/ Silver price reported as "London Spot/US Equiv."

Source: Platt's Metals Week.

$\begin{tabular}{ll} TABLE & 3 \\ U.S. & IMPORTS & AND & EXPORTS & OF GOLD & 1/2 \\ \end{tabular}$

(Kilograms of gold content, unless otherwise specified)

	Ores and	Doré and	Refined	Ash and		Waste and scrap	Metal powder	Gold compounds
Period and country	concentrates 2/	precipitates	bullion 3/	residues	Total 4/	(gross weight)	(gross weight)	(gross weight)
Imports for consumption:								
1999	117	24,300	196,000	133	220,000	30,500	5,500	9,400
2000:	_							
January	1	1,770	15,200	(5/)	17,000	1,000	129	323
February:								
Argentina		103			103			
Brazil			4,670		4,670			100
Canada		52	2,920		2,970	253	17	
Chile		936	375		1,310			
Colombia		180	1,030		1,210			1,480
Costa Rica		8			8	126		
Dominican Republic			21		21	528		
Mexico		393	16		409	207		
Nicaragua		17	147		164			
Peru		867	662		1,530	1		
Uruguay			2,330		2,330			
Other	5	126	167		298	87	1	59
Total	5	2,680	12,300		15,000	1,200	18	1,640
Year to date	6	4,450	27,500	(5/)	32,000	2,200	147	1,960
Exports:								
1999	117	87,300	435,000		523,000	40,000	270	561,000
2000:								
January	1	8,550	61,000		69,500	6,340	168	16,200
February:								
Australia			7,780		7,780			60
Canada		297	3,970		4,270	2,100	1	280,000
China						339		
Germany			11		11	211	1	
Israel		3			3		3	7,220
Italy			22		22	111		16,800
Korea, Republic of								8,700
Mexico			4,740		4,740	280	7	175
Peru			322		322			
Switzerland		6,970	51,300		58,200			
United Kingdom	. 1		13,300		13,300	2,260	2	128
Other		3	218		221	174	1	4
Total	1	7,270	81,600		88,900	5,470	14	313,000
Year to date	2	15,800	143,000		158,000	11,800	181	330,000
Zero.						,	·	,,,,,

⁻⁻ Zero.

 $^{1/\,\}text{Data}$ are rounded to no more than three significant digits; may not add to totals shown.

 $^{2\!/}$ Includes gold content of base metal ores, concentrates, and matte imported for refining.

^{3/} Bullion also moves in both directions between U.S. markets and foreign stocks on deposit in the Federal Reserve Bank. Monetary gold excluded.

^{4/ &}quot;Waste and scrap," "Metal powder," or "Gold compounds" not included in "Total."

^{5/} Less than 1/2 unit.

 ${\bf TABLE~4} \\ {\bf U.S.~IMPORTS~AND~EXPORTS~OF~SILVER,~REFINED~AND~AS~NITRATE~1/}$

(Kilograms)

Period and country	Bullion (silver content)	Doré (silver content)	Total (silver content)	Other unwrought silver (gross weight)	Metal powder (gross weight)	Silver nitrate (gross weight)
Imports for consumption:	,	, ,	,			
1999	2,660,000	404,000	3,060,000	126,000	120,000	4,450
2000:	- ' '					
January	268,000	15,600	284,000	14,700	4,690	
February:	_					
Belgium	- 					1,860
Canada	103,000		103,000	338	2/ 26	,
Chile	- ′ <u></u>	9,710	2/ 9,710			
Colombia	- 	451	451			
France	- 	<u></u>	<u></u>		100	
Germany	- 				1,230	
Japan	- 			15	5,520	171
Mexico	91,200	5,260	96,500	644		
Panama	110	5,200	110			
Peru	14,300		14,300		1,000	
Switzerland	- 11,500				187	
United Kingdom	801,000		801,000			
Other	48		48		1	
Total	1,010,000	15,400	1,020,000	997	8,060	2,030
Year to date	1,280,000	31,000	1,310,000	15,700	12,800	2,030
Exports:	_ 1,260,000	31,000	1,510,000	13,700	12,000	2,030
1999	481,000	64,400	545,000	75,100	318,000	62,500
2000:	_ 401,000	04,400	545,000	73,100	310,000	02,300
January	56,900	3,450	60,300	4,690	15,900	18,500
February:		3,430	00,500	7,070	13,700	10,500
Australia	243		243			
Belgium			243	60		
Canada	- 15		15	196	1,430	3,820
China	_ 13		13		1,430	2,540
Dominican Republic				796		2,540
France				15	1,410	
Germany				68	4,050	
Hong Kong					1,510	
Italy	- 			9	1,310	
Japan				12	16,100	43
Korea, Republic of	- 			12	860	43
Mexico	1,150	6,160	7,300	58	429	141
Netherlands	_ 1,130	0,100	7,300	J6 	3,740	38
					3,740 192	
Singapore						
Sweden	- 	1 470	1 470		1,220	
Switzerland		1,470	1,470		556	
Taiwan	_ 59		59	999	2,460	
Thailand	_ 312		312		156	
United Kingdom		717	717	 1 <i>5</i>	2,840	
Other			10.100	15	49	
Total	1,770	8,340	10,100	2,230	37,100	6,580
Year to date	58,700	11,800	70,500	6,910	53,100	25,000

⁻⁻ Zero.

^{1/} Data are rounded to no more than three significant digits; may not add to totals shown.

^{2/} All or part of these data have been referred to the Bureau of the Census for verification.

 ${\bf TABLE~5} \\ {\bf U.S.~IMPORTS~AND~EXPORTS~OF~SILVER,~RAW,~SEMIMANUFACTURED,~AND~WASTE~AND~SCRAP~1/}$

(Kilograms of silver content, unless otherwise specified)

	Silver ores and	Base metal ores and	Ash and		Semimanu- factured form 2/3/	Waste and scrap
Period and country	concentrates	concentrates	residues	Total	(gross weight)	(gross weight)
Imports for consumption:	=					
1999	10,800	2,750	101,000	115,000	139,000	1,640,000
2000:			0.400	0.1.10	0.470	2 < 2 0 0 0
January	36		9,100	9,140	8,150	268,000
February:	-				1.41	
Brazil			1.550	1.650	141	27.000.4
Canada Chile	101		1,550	1,650	10,300 4/ 15	37,800 4, 228
Dominican Republic						90
El Salvador						110
Germany	·				1,040 4/	251
Ireland	-				1,040 4/	79 4
Italy					243	75 4 7
Japan					75	
Korea, Republic of	-					9,970
Malaysia	- 					3,160
Mexico	- -				72	38,200 4
Philippines	- 					5,980
Poland	- 				483	5,700
Sweden	- 					97 4
Switzerland	- 				92 4/	<i>71</i> ₹
Taiwan	- 					732
United Kingdom	- 		1,170	1,170	307 4/	201
Other	- 					86 4
Total	101		2,730	2,830	12,800	96,900
Year to date	138		11,800	12,000	20,900	365,000
Exports:	-		11,000	12,000	20,,,00	202,000
1999	70,800			70,800	122,000	1,310,000
2000:	-			,	,	-,,
January	8,040			8,040	27,500	95,200
February:				3,0.0		7.0,=00
Belgium	- 				88	15,300
Canada	17,000			17,000	2,590	40,400
China	- 					12,500
Egypt	- 				432	
France					33	670
Germany	- 				117	30,400
Hong Kong	- 				396	50
Ireland					112	14,900
Israel	- 					234
Italy					967	5,680
Japan					38	4,310
Korea, Republic of	- 				154	40
Mexico	- 				757	27,900
Singapore					122	·
South Africa	- 					295
Spain	- 				1,290	
Sweden						4,990
Switzerland	- 				4	6,510
Taiwan	- 				1,780	4,400
Thailand	- 				103	
United Kingdom	- 				709	12,000
Other	- 				338	258
Total	17,000			17,000	10,000	181,000
Year to date	25,000			25,000	37,500	276,000

⁻⁻ Zero.

^{1/} Data are rounded to no more than three significant digits; may not add to totals shown.

^{2/} Containing 99.5% or more by weight of silver. Imports only.

^{3/} Semimanufactured (including silver plated with gold or platinum) forms of silver.

^{4/} All or part of these data have been referred to the Bureau of the Census for verification.

TABLE 6
U.S. IMPORTS OF PLATINUM-GROUP METALS 1/

(Kilograms of metal content, unless otherwise specified)

D. I. I.	Platinum grain and	Platinum	Other unwrought	Platinum,	Platinum waste and	Platinum	Unwrought	Palladium,	1.1. 2/	Unwrought	Unwrought	DI 1: 2/
Period and country	nuggets	sponge	platinum	other	scrap	coins	palladium	other	Iridium 2/	osmium	ruthenium	Rhodium 3/
Imports for consumption:	c 100	70.200	7.020	16.500	10.700	1.00	165,000	24 100	2.270	22	11 400	10.500
1999	6,100	78,300	7,820	16,500	19,700	169	165,000	24,100	2,270	23	11,400	10,500
2000:	2-2	2010		202	0.400	_		44 500			4.470	- 400
January	252	3,010	115	382	9,190	1	5,350	11,600	766		1,450	5,490
February:						(4.0						
Australia						(4/)						
Belgium		174					300					36
Brazil					(4/)							
Canada	(4/)	3		80 5/	(4/)	9	289	1				
China							63	16				
Colombia			23									
Dominican Republic					1							
France					(4/)				11		35	
Germany	63	268	36	152	229		351	116	19		72	26 5
Honduras							75 5/	/				
Hong Kong				123	45							
Ireland			39					7				
Israel			9				1 5/	/				
Italy	19	14					145	(4/)			(4/)	
Japan	31	49	(4/)				690	4				7
Korea, Republic of					(4/)							
Mexico					5							
Netherlands				4							31	
Norway		16					433 5/	/				
Peru	1 5/											
Russia			5				6,790					29
Saudi Arabia		4,630 5/										
South Africa	106	3,590		2			2,770	95	30		1,820	413
Spain				30							·	
Switzerland			8	81			1,290	40				
Taiwan												(4/)
Turkey	3											
United Kingdom		153	2	3			934		29		52	17
Total	222	8,900	123	474	280	9	14,100	280 5			2,010 5	
Year to date	474	11,900	238	856	9,470	11	19,500	11,900	854		3,460	6,020

⁻⁻ Zero.

^{1/} Data are rounded to no more than three significant digits; may not add to totals shown.

^{2/} Unwrought and other forms of iridium.

^{3/} Unwrought and other forms of rhodium.

^{4/} Less than 1/2 unit.

^{5/} All or part of these data have been referred to the Bureau of the Census for verification.

$\label{eq:table 7} \text{U.S. EXPORTS OF PLATINUM GROUP METALS 1/}$

(Kilograms of metal content, unless otherwise specified)

Period and country	Palladium 2/	Platinum 2/	Platinum waste and scrap	Iridium, osmium and ruthenium 2/3/	Rhodium 2/
Exports:	I diludidili 2	1 100110111 2/	зетир	100110111111111111111111111111111111111	100000000000000000000000000000000000000
1999	43,900	19,400	7,660	851	114
2000:		, , , , ,	,,,,,,,		
January	4,800	6,350	771	106	171
February:					
Argentina		(4/)			
Australia	. 14	13			
Belgium	6		3		
Bolivia				1	
Brazil	32	39			
Canada	305	172	43	2	(4/)
China	212				·
Denmark		2			
Dominican Republic	15				
Finland		2			
France	9	16	(4/)		
Germany	384	124	206	15	
Greece	6				
Guatemala					(4/)
Hong Kong			6		(4/)
India		3			
Ireland		7		13	
Israel	333	1			
Italy	20	9	1		
Japan	659	292		1	13
Korea, Republic of	72	1			21
Malaysia	2	(4/)			
Mexico	3	13			(4/)
Netherlands	. 27	30		15	
New Zealand	6				
Philippines	2	2			
Singapore		1			
Spain	. 12	181			
Sweden		2	4	(4/)	
Switzerland	69	240			
Taiwan	2,000	6			8
Thailand	2	10			
Turkey	1				
United Arab Emirates	1				(4/)
United Kingdom	91	232	87	75	
Total	4,280	1,400	349	121	42
Year to date	9,080	7,750	1,120	227	213

⁻⁻ Zero.

^{1/} Data are rounded to no more than three significant digits; may not add to totals shown.

 $^{2/\} Unwrought$ and other forms.

^{3/} Gross weight.

^{4/} Less than 1/2 unit.